

*CM*

I CLAIM AS MY INVENTION:

1. A blow molding machine comprising:

a blow molding wheel having a plurality of molds at its periphery each having two separable segments and said wheel being rotatable on an axis;

guide track means forming a closed circuit and disposed to register at least in part alignment with the traverse of said wheel for a discrete distance;

plural carriages on said guide track means;

driving means including wheel driving means and carriage driving means for simultaneously and synchronously driving said wheel and said carriages through said discrete distance at zero relative velocity;

a label suction means on each carriage to grasp a label from a source of supply adjacent the guide track means; and

means to move said label suction means and the label into the adjacent mold part while moving through said discrete distance at said zero relative velocity.

2. The method of blow molding which includes the steps

of:

continuously and sequentially moving a plurality of molds through a first closed circuit;

at one point in said first closed circuit continuously forming a parison of moldable plastic material;

opening the mold so that it is open at said one point in the first closed circuit;

drawing off a portion of the parison into each respective mold at said first point in the first closed circuit to charge the mold;

thereafter closing the charged mold;

introducing a gaseous medium into the parison within the charged mold to expand the parison into a hollow object corresponding to the size and shape of the mold; at a second point in the first closed circuit opening the mold and ejecting the molded article therefrom to condition the mold for repeating the cycle; continuously and sequentially moving a plurality of carriages through a second closed circuit; at one point in the second closed circuit picking up one or more labels from a label supply station for transport on a carriage; intersecting the two closed circuits at a matched segment in both circuits; moving the mold parts and the carriage through the matched segment in unison at zero relative velocity; transferring said one or more labels from the carriage to a corresponding mold part during the unison movement through the matched segment; and synchronously driving both of said first and second circuits in unison from a common power source; thereby to continuously effect in-mold labeling of all of the articles molded in the first closed circuit.

3. The method of in-mold labeling of a blow molded article which includes the steps of:  
continuously driving a trolley through a closed circuit;  
at one point in the circuit pressure pre-positioning a label to be applied to its molded article;  
drawing-off and pressure retaining the label onto the trolley for continuous movement in the circuit;  
at a second point in the circuit shifting the trolley and its label in a lateral direction towards registration

N  
N  
N  
N

with a mold without interruption of the continuous driving of the trolley in the circuit;  
at a third point in the circuit simultaneously releasing retaining pressure on the trolley while pressure retaining the label on the mold to transfer the label to the mold;  
at a fourth point in the circuit shifting the trolley in a lateral direction to condition the trolley for picking up another label without interruption of the continuous driving of the trolley in the circuit; and thereafter recycling the trolley to said first point in the circuit.

B // 3. *Apparatus for*  
B // *for in-mold labeling of a blow molded article in a*  
B // *multiple station blow molding machine comprising:*  
B // *at least one mold;*  
B // *guide track means forming an endless closed circuit*  
B // *through which to drive a carriage means;*  
P // *pressure pre-positioning means forming a label pick-up*  
P // *station adjacent said guide track means;*  
P // *carriage means having an air actuating means for drawing-*  
P // *off a label from said pick-up station and pressure*  
P // *retaining a label onto the carriage means for*  
P // *transport thereof on the carriage means;*  
P // *said guide track means having transfer station means for*  
P // *shifting the carriage means and the label transported*  
B // *thereby in a lateral direction towards registration*  
P // *said*  
P // *with the mold without interruption of the continuous*  
P // *movement of the carriage means in the guide track*  
P // *means;*  
P // *releasing means at said transfer station for simultane-*  
P // *ously releasing retaining pressure on the carriage*

means while pressure retaining the label on the mold to transfer the label to the mold at the point of registration of the carriage means with the mold;

*R* said guide track means having means shifting the carriage back in a lateral direction to condition the carriage means for picking up another label without interruption of the continuous movement of the carriage means in the guide track means;

*B* whereby the carriage means can be continuously driven in an endless closed circuit in synchronism with the multiple station blow molding machine.

*11* *8.* The apparatus of claim *4*, wherein said pressure pre-positioning means further comprises:

at least one label rack means for arranging and holding a stack of labels in a desired position; grasping means on said carriage means for grasping a single label from said label rack means.

*11* *14* *8.* The apparatus of claim *8*, wherein said grasping means has at least two air pressurized suction cup members for grasping said label from said rack means.

*14* *15* *8.* The apparatus of claim *8*, wherein said at least two suction cup members are spaced apart a predetermined distance and said air actuating means for drawing-off passes between said suction cup members and draws-off and retains the label from said suction cups of said grasping means.

*15* *16* *8.* The apparatus of claim *8*, wherein said at least two suction cup members provide a rigid engagement line on the label which is engaged by said air actuating means for drawing-off to

provide a precise transfer of the label while keeping the label in a smooth unwrinkled state.

11  
12A. The apparatus of claim 7, wherein said label rack means and the stack of labels are arranged at a positive angle with respect to the horizontal and has a weighted member at the end of the stack, a rotatable arm member opposite said stack whereby said arm member picks a label from the stack and places it on the carriage means.

12  
13A. The apparatus of claim 7, wherein said label rack means has a label retention and adjustment means at the end of the label stack opposite said weighted member to prevent the labels from falling out while allowing the rotatable arm member to remove one label at a time and providing adjustability of the label position while the apparatus continues its motion.

14. The apparatus of claim 7, wherein said means for drawing-off and pressure retaining the label onto the trolley is a rotatable turret member having at least one air pressurized suction cup member.

15. The apparatus of claim 14, wherein said at least one suction cup member is resiliently affixed to said turret so that it may yield upon contact with said mold.

16. The apparatus of claim 7, wherein said carriage means has at least two parallel elongated base members which extend across the width of said guide track and are affixed at their ends to each transport chain, said means for drawing-off being a rotatable turret having at least one air pressurized suction cup member for retaining said label on said trolley, said turret

being mounted to at least one of said base members in a slidable manner whereby said turret may be laterally moved to a desired position between said drive chains along said base member.

11 5 14. The apparatus of claim ~~4~~, wherein said means for shifting in the circuit is a cammed surface which cooperates with a cam follower on said carriage means to provide the desired motion.

11 9 15. The apparatus of claim ~~4~~, wherein said means for drawing-off and pressure retaining the label onto the carriage means has an air valve which momentarily cuts the air pressure to said means for drawing-off and retaining when the label is in the position corresponding to the point of registration.

11 10 16. The apparatus of claim ~~15~~, wherein said pressure retaining of the label on the mold is supplied by an air vacuum line which extends through the mold and draws the label into the mold cavity.

11 6 ~~17~~. The apparatus of claim ~~4~~, wherein said apparatus is adjustable to provide proper positioning of the entire apparatus with respect to the mold.

18. The method of in-mold labeling of a blow molded article which includes the steps of:

continuously driving a trolley through a closed circuit; at one point in the circuit pressure pre-positioning at least two labels to be applied to a molded article; drawing-off and pressure retaining the labels onto the trolley for continuous movement in the circuit;

N

at a second point in the circuit repositioning the trolley and the labels for lateral movement;

at a third point in the circuit shifting the trolley and its labels in lateral directions towards registration with a mold without interruption of the continuous driving of the trolley in the circuit;

at a fourth point in the circuit simultaneously releasing retaining pressure on the trolley while pressure retaining the labels on the mold to transfer the labels to the mold corresponding to the points of registration;

at a fifth point in the circuit repositioning the trolley for lateral movement;

at a sixth point in the circuit shifting the trolley in a lateral direction to condition the trolley for picking up at least another two labels without interruption of the continuous driving of the trolley in the circuit; and

thereafter recycling the trolley to said first point in the circuit.

B

2  
11. An apparatus for in-mold labeling of a blow molded article comprising:

- P guide track means forming a closed circuit;
- L trolley means in said closed circuit and drive means for continuously driving said trolley means through said circuit without interruption;
- P pressure pre-positioning means at one point in the circuit for picking up at least two labels to be applied to a molded article;

10<sup>P</sup> suction means on said trolley means for drawing-off and pressure retaining the labels onto the trolley means for continuous movement in the circuit;

11<sup>X</sup> means for repositioning the trolley means and the suction means for lateral movement;

12<sup>B</sup> *Jns B2* said guide track means having means for shifting the trolley means in lateral direction parallel to said path with an open mold without interruption of the continuous driving of the trolley means in the circuit;

13<sup>P</sup> means for simultaneously releasing retaining pressure on the trolley carried suction means while pressure retaining the labels on the mold parts to transfer the labels to the mold parts;

14<sup>X</sup> means for repositioning the trolley means for lateral movement;

15<sup>P</sup> said guide track means having means for shifting the trolley means in a lateral direction to condition the trolley means for picking up a new change of labels without interruption of the continuous driving of the trolley means in the circuit; and

16<sup>P</sup> means for recycling the trolley means to said one point in the circuit.

20. A label transporting and dispensing apparatus for use in a blow molding machine having at least one mold pair made up of two mold halves, each mold half having at least one respective mold cavity which accepts material to be molded when the mold halves are in a first open position and the material is then molded into a desired shape when the mold halves are in a second closed position comprising:

a label dispenser capable of dispensing two labels simultaneously;

at least two transport chains separated a predetermined distance;

at least one trolley affixed to said transport chains and having at least two rotatable turret label engagement assemblies each having at least one air controlled suction cup member capable of engaging, grasping and releasing a label from said label dispenser, each of said turrets having at least one guide arm;

a guide track means for accepting said guide arms and said transport chains and for providing movement of said transport chains and said at least one trolley, said guide track means being positioned between said transport chains, said guide track means having at least three sections

a first of said at least three sections comprising a matching segment positioned between an arc segment through which said mold pairs move in their open position and a second of said at least three sections being positioned adjacent said label dispenser,

each of said sections having a respective means for engaging said guide arms of said turrets and for providing positioning of said label engagement assemblies of said trolley; and

air suction label retaining means within each of said mold cavities of said mold halves;

whereby each of said label engagement assemblies engages and grasps a label from said label dispenser, the labels are transported to a position within each mold cavity of at least one

respective pair of molds in their open position by said transport chains, the label engagement assemblies and the labels moving through said matching segment at zero relative velocity with respect to the mold parts for positioning the labels within said mold cavities, said labels are simultaneously released from said label engagement assemblies and are retained within said mold cavities by said label retaining means and said label engagement assemblies are transported back to said label dispenser to repeat the cycle.

21. The apparatus of claim 20, wherein said at least one trolley has at least two parallel elongated base members which extend across the width of said guide track and are affixed at their ends to each drive chain, said turret being mounted on one of said at least two base members in a slidable manner whereby said turret may be moved to a desired position between said drive chains along said base member.

22. The apparatus of claim 21, wherein said at least one suction cup of said label engagement assemblies are in a position parallel to the direction of travel of said transport chain when in a position adjacent said label dispenser and said label engagement assemblies are separated from each other a predetermined distance.

23. The apparatus of claim 22, wherein said at least one suction cup of said label engagement assemblies are rotated outward by said positioning means of said third section of said guide track to a position perpendicular to the direction of travel of said transport chain and are brought together by said positioning means of said third section to a desired position proximate the center of said third section.

24. The apparatus of claim 22, wherein said at least one suction cup of said label engagement assemblies are moved perpendicularly outward from the direction of travel of said transport chains by said positioning means of said first section of said guide track to a position within the mold cavities of a respective mold pair in its open position proximate said label retaining means and is then returned to its original position by said positioning means.

25. The apparatus of claim 24, wherein said at least one suction cup of said label engagement assemblies are rotated by said positioning means of said second section of said guide track to their original positions parallel to the direction of travel of said transport chain and are separated by said positioning means of said second section to their original predetermined distance.

26. The apparatus of claim 24, wherein said means for positioning is in the form of at least one cammed surface which cooperates with said at least one guide arm to perform the rotation and positioning of said label engagement assemblies.

27. The apparatus of claim 25, wherein said cam means of said second and third sections of said guide track have at least two separate cams which engage two guide arms on said turrets whereby one cam and guide arm provide rotation of the turret and the other cam and guide arm provide inward and outward movement of the turret in a direction perpendicular to the direction of travel of said transport chain.

28. The apparatus of claim 25, wherein said blow molding machine has a plurality of mold pairs arranged in a circle which rotate in unison about a central axis of the circle.

29. The apparatus of claim 28, wherein said apparatus engages a respective mold pair from the outer periphery of said circle and repeats the cycle for each mold pair as it rotates past said first section of said guide track.

30. The apparatus of claim 28, wherein said apparatus engages a respective mold pair from the outer periphery of said circle and has a plurality of trolleys for providing a label within each cavity of a respective mold pair as it rotates past said first section of said guide track.

31. The apparatus of claim 30, wherein said apparatus has a plurality of trolleys and the transport chains are timed and the distances between trolleys is established so the cycle of said apparatus will be synchronized with the cycle of said circular blow molding machine and a trolley will register with an appropriate mold pair throughout the cycle.

32. The apparatus of claim 30, wherein said apparatus has a plurality of trolleys and a plurality of mold pairs and the transport chains are timed and the distances between trolleys is established so that each cavity of a respective mold pair receives a label when it is rotated past said first section of said guide track.

33. The apparatus of claim 20, wherein said suction cup of said engagement assembly is resiliently mounted whereby said label may be pressed up against the cavity of a respective mold

pair to provide effective positioning of the label against said  
label retaining means and the suction cup may yield against an  
excessive force without damaging any members.

*Add AF*